ONTARIO MINISTRY OF ENVIRONMENT
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ONTARIO WATER
RESOURCES COMMISSION

ANNUAL REPORT 1965

ELMIRA

water pollution control plant

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1965
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DIVISION OF PLANT OPERATIONS

Ontario Water Resources Commission

TD
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1965

Elmira : water pollution control plant.
82202

ONTARIO WATER RESOURCES COMMISSION

OFFICE OF THE GENERAL MANAGER

Members of the Town of Elmira Local Advisory Committee,
Elmira, Ontario.

Gentlemen:

I am pleased to provide you with the 1965 Annual Report for the Elmira Water Pollution Control Plant, OWRC Project No. 61-S-96.

We appreciate the co-operation you have extended to our Operations staff throughout the year, and trust that continuation of this close association will ensure even greater progress in the sphere of water pollution control.

Yours very truly,

D. S. Caverly,
General Manager.

TD
227
E55
W38
1965
MOE

ONTARIO WATER RESOURCES COMMISSION
801 BAY STREET
TORONTO 5

J. A. VANCE, LL.D.
CHAIRMAN
J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER
W. S. MacDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir,

I am pleased to provide you with the 1965 Annual Report on the operation of the Elmira Water Pollution Control Plant, OWRC Project No. 61-S-96.

The report presents design data, outlines operating problems encountered during the year and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

B C Palmer

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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FOREWORD

This report provides useful information on the operating efficiency of this project during 1965. It is intended to act as a guide in gauging plant performance. To implement that aim, it includes detailed statistical and cost data, a description of the project and a summary of its operation during the year.

Of particular interest will be the cost data, which show the total cost to the municipality and the areas of major expenditure.

The Regional Operations Engineer is primarily responsible for the preparation of the report, and has compiled and arranged the material. He will be pleased to answer any questions regarding it. Other groups, however, were involved in the production, and these include the statistics section, the Drafting Section of the Division of Sanitary Engineering and the Division of Finance.

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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Environment Ontario
Laboratory Library
125 Resources Rd.
Etobicoke, Ontario M9P 3V6
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ELMIRA

water pollution control plant

operated for

THE TOWN OF ELMIRA

by the

ONTARIO WATER RESOURCES COMMISSION

CHAIRMAN: Dr. James A. Vance

VICE-CHAIRMAN: J. H. H. Root, M.P.P.

COMMISSIONERS

W. D. Conklin, Q.C.
D. A. Moodie
H. E. Brown
L. E. Venchiarutti

GENERAL MANAGER: D. S. Caverly

ASSISTANT GENERAL MANAGERS

L. E. Owers
F. A. Voege
K. H. Sharpe
A. K. Watt

COMMISSION SECRETARY

W. S. MacDonnell

DIVISION OF PLANT OPERATIONS

DIRECTOR: B. C. Palmer

Assistant Director: C. W. Perry
Regional Supervisor: D. A. McTavish
Operations Engineer: B. W. Hansler

801 Bay Street Toronto 5

'65 REVIEW

The report presents in detail significant data on the operation of various treatment units at the Elmira Water Pollution Control Plant during 1965.

The average daily flow during the year was 0.439 million gallons. The average BOD and suspended solids in the effluent were 79 ppm and 63 ppm respectively. Average BOD and suspended solids removals were 58.0 percent and 51.2 percent respectively. The effluent BOD and suspended solids were greater than the OWRC objectives for each of 15 ppm for most of the time during the year.

A total of 158.409 million gallons of combined industrial and domestic wastes were treated during the year at an operating cost of $26,960.67. The operating cost per million gallons and the cost per pound of BOD removed were $170.20 and $0.16 respectively.

Under supervision by head office engineers, the plant staff has operated a clean, attractive and an efficient as possible plant for the Town of Elmira.

HISTORY

1961 - 1965

INCEPTION

In July, 1961, the Town of Elmira in partnership with Naugatuck Chemicals Ltd. and the Ontario Water Resources Commission initiated plans for the construction of the water pollution control plant.

The firm of Canadian British Engineering Consultants was engaged to prepare plans and specifications for the project.

APPROVAL

On December 7, 1963, the town executed an agreement with the Ontario Water Resources Commission to finance, construct and operate the plant.

CONSTRUCTION

Dunker Construction Ltd. began construction on December 16, 1963, and the Division of Plant Operations took over operation on December 1, 1964.

TOTAL COST

The total cost of the project was $586,432.00

GLOSSARY

BOD	biochemical oxygen demand (a measure of organic content)
cfm	cubic feet per minute
comminution	shredding of solids into small fragments
DWF	dry weather flow
effluent	outflow
flocculation	bringing very small particles together to form a larger mass (the floc) before settling
fps	feet per second
gpcd	gallons per capita per day
gpm	gallons per minute
grit	sand, dust, stones, cinders and other heavy inorganic material
influent	inflow
lin. ft.	lineal feet
mgd	million gallons per day
mlss	mixed liquor suspended solids
ppm	parts per million
ss	suspended solids
TDH	total dynamic head (usually refers to pressure on a pump when it is in operation)

W. SUTHERLAND
CHIEF OPERATOR

Project Staff

Operators

H. Ossel L. Gross

COMMENTS

The plant was normally supervised eight hours per day during weekdays and four hours per day during the weekend.

Mr. H. Ossel successfully completed the Basic and Intermediate Sewage operators' courses sponsored by the OWRC. The Senior Operators' course will be conducted early in 1966.

Description of Project

Flow from Naugatuck Chemicals Ltd. first enters a 177,000 gallon balancing tank which was designed to prevent surges of industrial wastes from reaching the water pollution control plant. From the balancing tank, industrial wastes are pumped to a flash mixer in the pretreatment building.

At this point, if necessary, lime is mixed with the industrial wastes. From the flash mixer, flow to an outside flume is controlled by an adjustable weir. Excessive industrial wastes are conducted by gravity back to the balancing tank. Industrial wastes reaching the flume from the flash mixer pass through a Venturi flume before mixing with wastes from the Town.

Wastes from the Town enters an open flume at the pretreatment works which also contains a Venturi flume. Both open flumes meet resulting in a mixing of both Town sewage and industrial wastes prior to discharging to the water pollution control plant.

All Town sewage flows and industrial waste flows are metered at the pretreatment works and telemetered to the water pollution control plants.

PRIMARY TREATMENT

Entering the main plant, the flow passes through the treatment processes by gravity.

Flow first passes through two grit channels located in parallel. Velocity in the grit channels is controlled by a flume downstream from the grit channels.

From the grit chamber the flow continues to two primary clarifiers each 40 feet in diameter with an 8 foot side water depth. Each clarifier is provided with a circular sludge collector mechanism which moves the settled bottom raw sludge to a central sump at the bottom of the clarifier from where it is withdrawn and discharged to the primary digestion tank.

Circular scum removal mechanisms skim floating material from the top of each clarifier. This material is also pumped to the primary digester.

AERATION

Primary clarifier effluent enters a junction box from where it is passed to a four cell aeration section. Each cell is equipped with one Ames Crosta "Simplex" mechanical aerator.

The tanks, continually seeded with activated sludge settled in the final clarifiers, provide the environment where, through biological action, the finely divided, suspended and colloidal particles are oxidized.

FINAL CLARIFIERS

Two 45-foot diameter circular final

tanks with 7-foot side water depths receive the aeration effluent and allow settling of the activated sludge. The clarifier sludge removal mechanisms are the rapid sludge removal type utilizing a revolving arm which removes the sludge by hydrostatic pressure. The settled sludge is returned to the head of the aeration section where it can either be returned to the aeration section or wasted to the primary clarifiers.

The effluent is discharged over weirs to the chlorine contact chamber and subsequently to Canangagique Creek.

CHLORINATION

The plant effluent is retained for approximately 22 minutes at design flow after chlorination in order to provide sufficient time for disinfection. A residual of 0.5 ppm of chlorine is maintained in the effluent discharged to the river.

SLUDGE DIGESTION TANKS

One primary digestion tank and one secondary digestion tank are provided. The primary tank receives combined raw sludge, waste activated sludge and scum from the primary clarifiers. This tank has a fixed, gas tight roof with gas collection piping. The sludge in the primary digester is heated by a boiler and heat exchanger that is fueled either by gas produced in the digesters or natural gas.

Mixers continually keep the primary digested sludge in suspension.

The secondary tank is used to complete the final stages of anaerobic digestion and to settle the digested sludge. The sludge in this digester is unheated and unmixed. The supernatant is returned to the inlet works. Sludge is normally removed from the secondary tank and removed from the plant grounds by tank truck.

PROJECT COSTS

NET CAPITAL COST (Estimated)		$586,431.74
DEDUCT - Portion Financed by CMHC (Estimated)	$386,270.00	
- Payments from Municipalities	100,085.00	486,355.00
Long Term Debt to OWRC		$100,076.74
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1965		$ 1,873.70
Net Operating		$ 26,960.67
Debt Retirement		1,837.00
Reserve		3,930.00
Interest Charged		8,770.51
TOTAL		$ 41,498.18

RESERVE ACCOUNT

Balance at January 1, 1965	$ -
Deposited by Municipality	3,930.00
Interest Earned	83.10
	$ 4,013.10
Less Expenditures	-
Balance at December 31, 1965	$ 4,013.10

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER
JAN	1904.25	1014.38		163.23	228.76	227.89	45.36			76.25	148.38
FEB	1552.98	1074.46		261.53	186.92		5.27			24.80	
MARCH	2443.76	914.39	144.00	199.33	180.47	224.03	341.34	216.86	13.39	70.87	139.08
APRIL	1902.32	1122.41	242.34	218.83	235.12		55.72			27.90	
MAY	2563.68	1464.71	141.72	240.13	229.92		52.76	35.93	15.82	127.65	255.04
JUNE	2020.40	1063.87		87.34	234.79	224.03	166.50	69.58		174.29	
JULY	1791.78	1107.00		100.11	175.85		80.12			123.81	204.89
AUG	2330.88	1514.93		82.97	158.17	224.03	78.02	102.23	33.35	137.18	
SEPT	2028.03	1136.88		91.83	184.17	8.89	304.76	28.55		60.70	212.25
OCT	2368.99	1634.57	224.40	92.40	201.26		59.57			156.79	
NOV	2982.54	1216.88	400.37	101.26	214.77	224.03	91.62		364.75	198.06	170.80
DEC	3071.06	1123.43	481.04	161.23	275.22	224.03	173.20	206.00	3.12	423.79	
TOTAL	26960.67	14387.91	1633.87	1800.19	2505.42	1356.93	1454.24	659.15	430.43	1602.09	1130.44

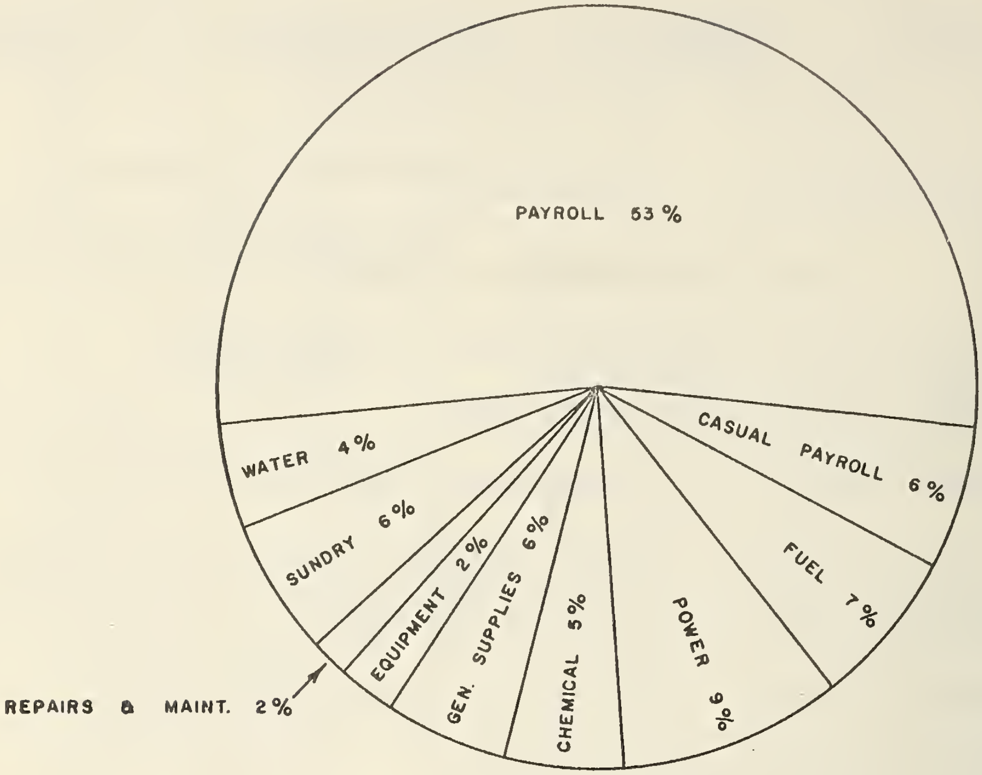
* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE $336.00

YEARLY OPERATING COSTS

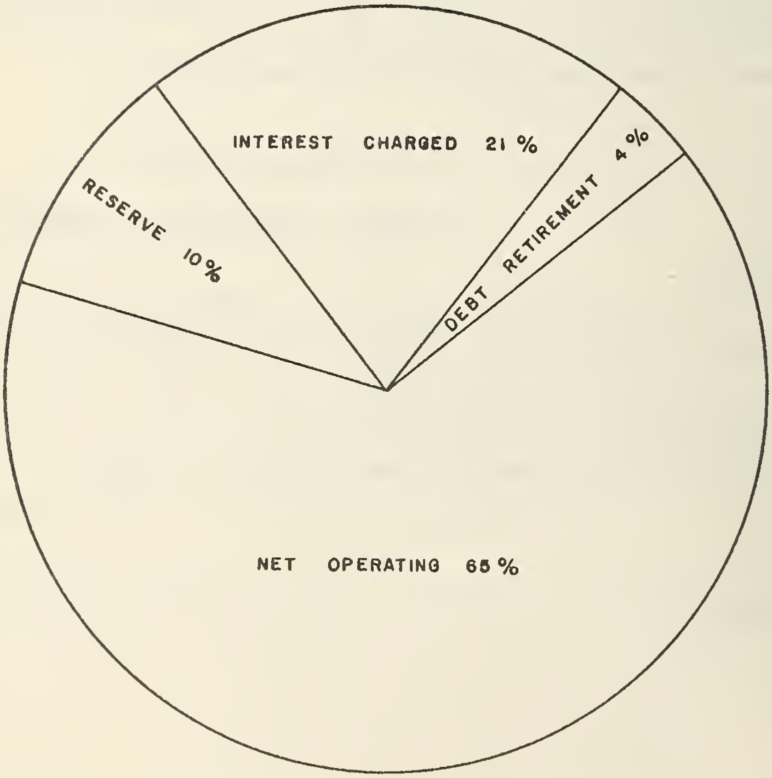
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1965	158.409	26960.67	* 27.81	170.20	16 CENTS

* BASED ON ESTIMATED ANNUAL POPULATION AND 3.9 PERSONS PER FAMILY

1965 OPERATING COSTS



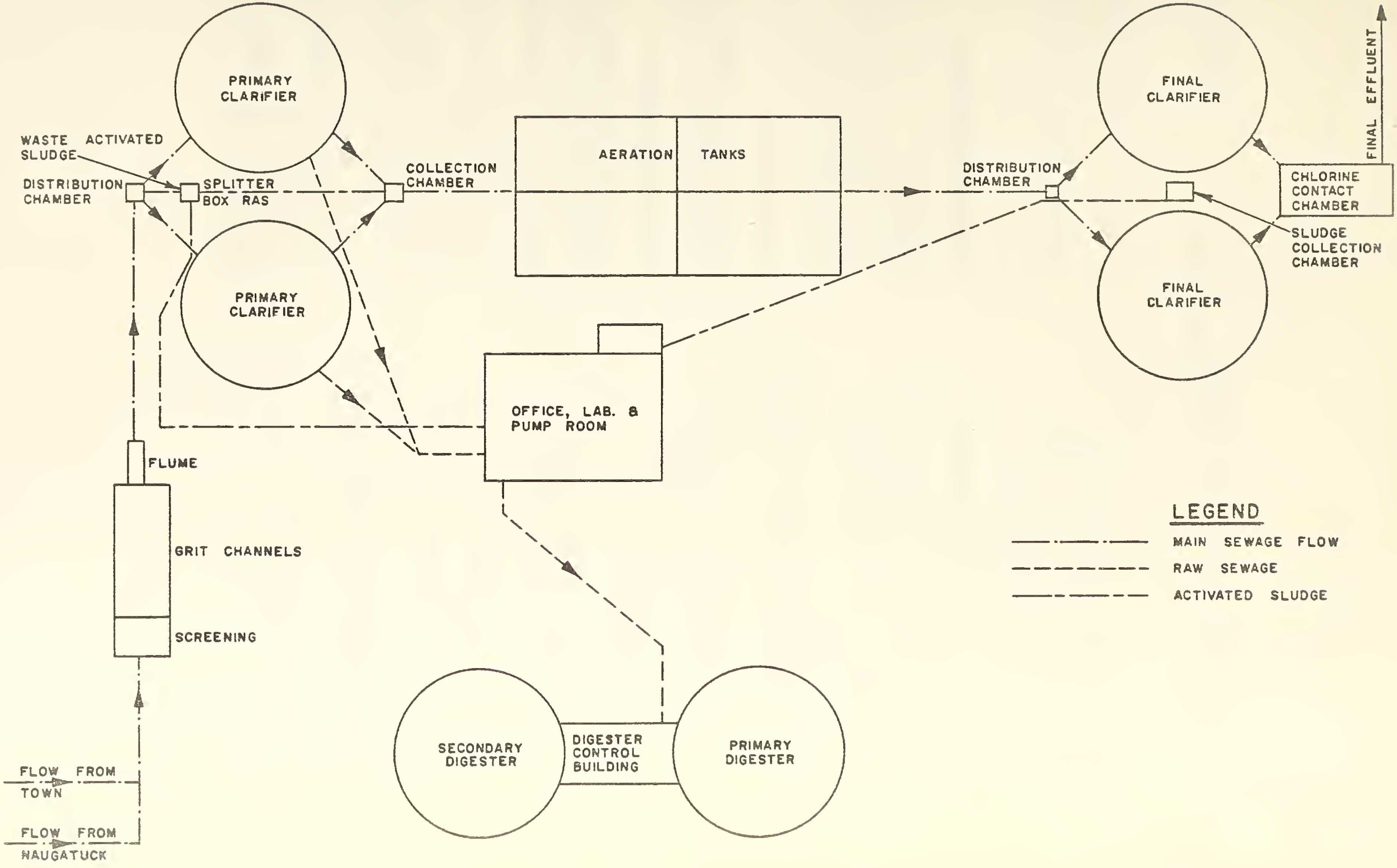
TOTAL ANNUAL COST



Technical Section

TOWN OF ELMIRA W.P.C.P.

SCHEMATIC OUTLINE OF PLANT SHOWING SEWAGE FLOW



Design-Data

Type of Plant - Activated sludge.

Design Population - 5,000 persons

Per Capita Flow - 100 GPD

Municipal Design Flow - 500,000 IGPD

Industrial Design Flow - 180,000 IGPD

Total Design Flow - 680,000 IGPD

Five Day BOD -

Domestic raw sewage - 170 PPM

Industrial Wastes - 1100 PPM

Total 5 day BOD - 420 PPM

Suspended Solids -

Domestic raw sewage - 300 PPM

Industrial Wastes - 320 PPM

Total suspended solids - 306 PPM

Pretreatment Facilities for Industrial Wastes

A balancing tank is provided to neutralize the industrial wastes utilizing a lime slurry.

Dimension of balancing tank - 60' D x 10' SWD

Volume of balancing tank - 177,000 gals.

Detention period - 23.6 hours

Primary Treatment

Screens

The combined flow (domestic and industrial) passes through a coarse, manually-cleaned bar screen.

Grit Channels

2 hand-cleaned conventionally designed grit channels.

Primary Clarifiers

2 circular settling tanks with rotating sludge removal mechanisms

dimension of each tank - 40'D x 8'

volume of each tank - 62,500 gals.

total volume of 2 tanks - 125,000 gals.

detention time at design flow - 4.42 hours

surface settling rate at design flow - 270 gals. per sq. ft. of tank per day.

weir overflow rate at design flow - 2,700 gals. per lin. ft. or weir per day.

Secondary Treatment

Aeration Tank

Type of aeration - mechanical

Number of units - 4

Dimension of each unit - 30' x 30' x 14.17'.

Volume of each unit - 12,000 cu. ft.

Total volume of 4 units - 48,000 cu. ft. or 300,000 gals.

Detention period at design flow - 10.6 hours.

Final Clarifiers

2 circular settling tanks with rotating sludge removal mechanism.

dimension of each tank - 45'D x 7'

volume of each tank - 11,150 cu. ft.

total volume of two tanks - 22,300 cu. ft. or 139,000 gals.

detention period at design flow - 4.9 hours

surface settling rate - 214 gals. per sq. ft. of tank per day.

weir overflow rate at design flow - 2400 gals. per lin. ft. of weir per day.

Chlorine Contact Chamber

Dimension of chamber 2 (30' x 6'x 4.74)

Volume of chamber - 1700 cu. ft. or 10,600 gals.

Detention time at design flow - 22.5 min.

Digestion Tanks

2 digesters for two-stage digestion

dimension of primary digestion tank - 30' D x 22'

volume of primary digestion tank - 15,600 cu. ft.

dimension of secondary digestion tank - 30'D x 21.5'

volume of secondary digestion tank - 15,200 cu. ft.

total volume of digestion tanks - 30,800 cu. ft.

heated digester capacity - 3.85 cu. ft. per capita.

Process Data

Flow data presenting Town sewage, industrial wastes and combined wastes on a monthly average basis and on a probability basis are plotted on the accompanying graphs.

During 1965, the plant was not at all times able to treat all of Naugatuck Chemical's wastes because of the combined factors of serious infiltration in the sewer system, fibres clogging plant mechanisms and the nature of the industrial wastes. Various attempts at acclimatization using progressive volumes of industrial wastes were made during the year with only partial success. This fact should be considered when interpreting the graphs and charts in this report.

During the year a total of 158.409 million gallons of combined wastes passed through the plant. The average design flow of 680,000 gallons was exceeded 19 percent of the time.

The plant received a total of 139.328 million gallons from the Town and 19.081 million gallons from Naugatuck Chemicals Ltd. during the year.

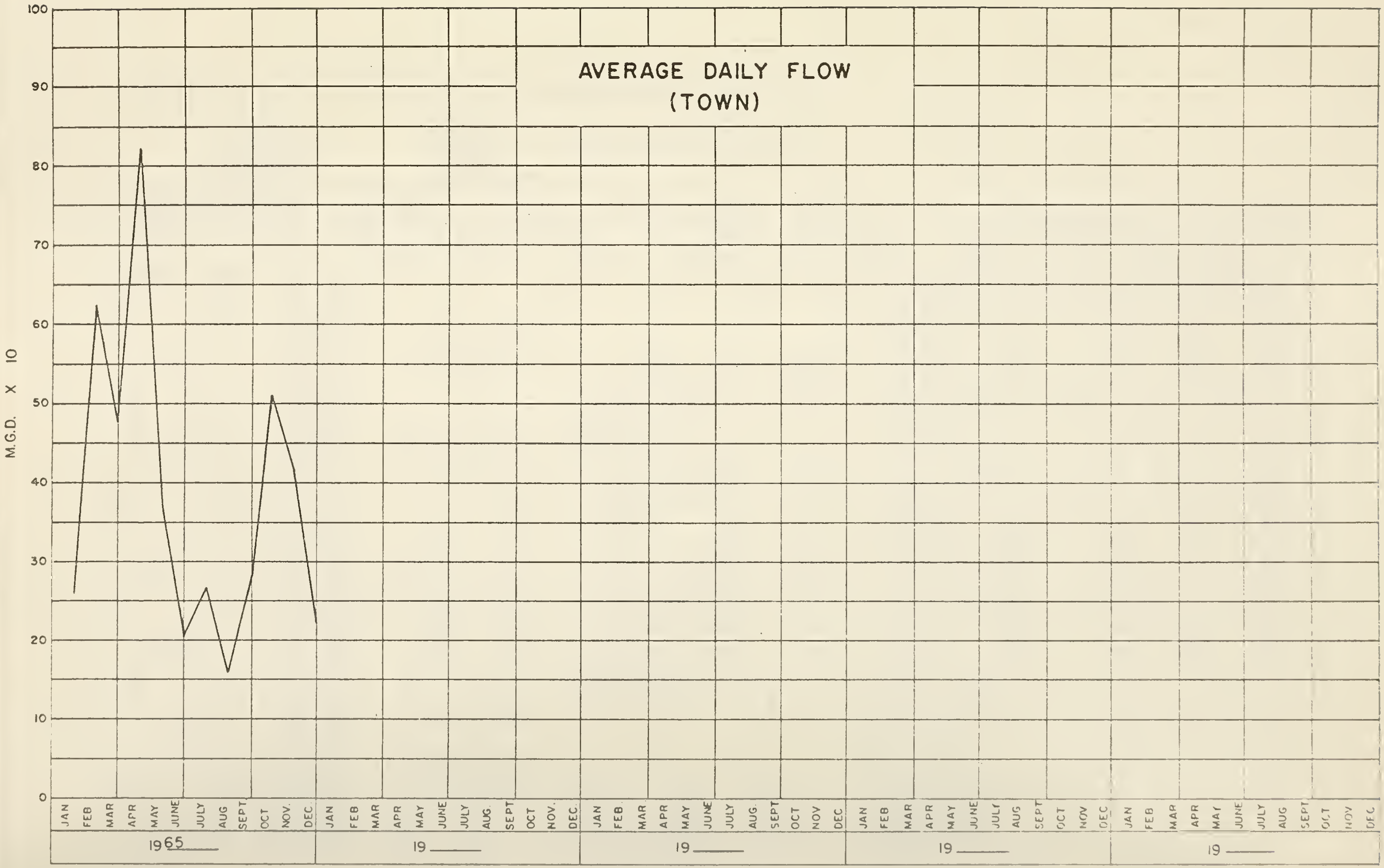
OPERATING SUMMARY

		TOWN			NAUGATUCK			COMBINED				
		Flow	BOD	SS	Flow	BOD	SS	Flow	Raw BOD	Raw SS	Final BOD	Final SS
Jan.	2	.427						.427				
	9	2.508						2.508				
	16	1.889	136	85				1.889				
	23	1.247						1.247				
	30	1.802			.172	265	33	1.974	220	122	39	39
Feb.	6	1.289	108	150	.399	1150	36	1.688	370	116	310	88
	13	7.295	100	198	.428	800	13	7.723	245	129	126	44
	20	3.723	114	126	.917	500	45	4.640	245	54	195	73
	27	4.683	66	82	.882	480	72	5.565	280	144	210	40
Mar.	6	4.718	30	81	.967	580	30	5.685	78	132	80	62
	13	5.235			1.094			6.329				
	20	2.732	215	154	1.015	920	74	3.747	450	104	235	76
	27	1.409	142	147	1.160	390	43	2.569	420	127	285	52
Apr.	3	2.104	180	151	1.386	480	570	3.490	300	284	400	58
	10	5.918	(2) 10	(2) 58	1.467	1250	119	7.385	280	77	320	76
	17	6.674			1.100			7.774				
	24	5.856	36	76	1.282	1200	110	7.138	240	77	195	66
May	1	5.906	46	62	1.419	570	32	7.325	140	48	90	100
	8	3.866	95	180	1.092	420	99	4.958	220	78	140	44
	15	3.128	74	91				3.128	114	101	16	21
	22	2.011	148	208				2.011	148	208	19	33
	29	1.430	106	138				1.430	106	138	13	17
June	5	1.333	60	162	.099	300	202	1.432	102	217	90	95
	12	1.234	215	212	.323	490	348	1.557	260	152	14	25
	19	1.053	295	66	.352	1200	88	1.405	540	-	245	258
	26	1.144	145	278	.366	420	464	1.510			66	112

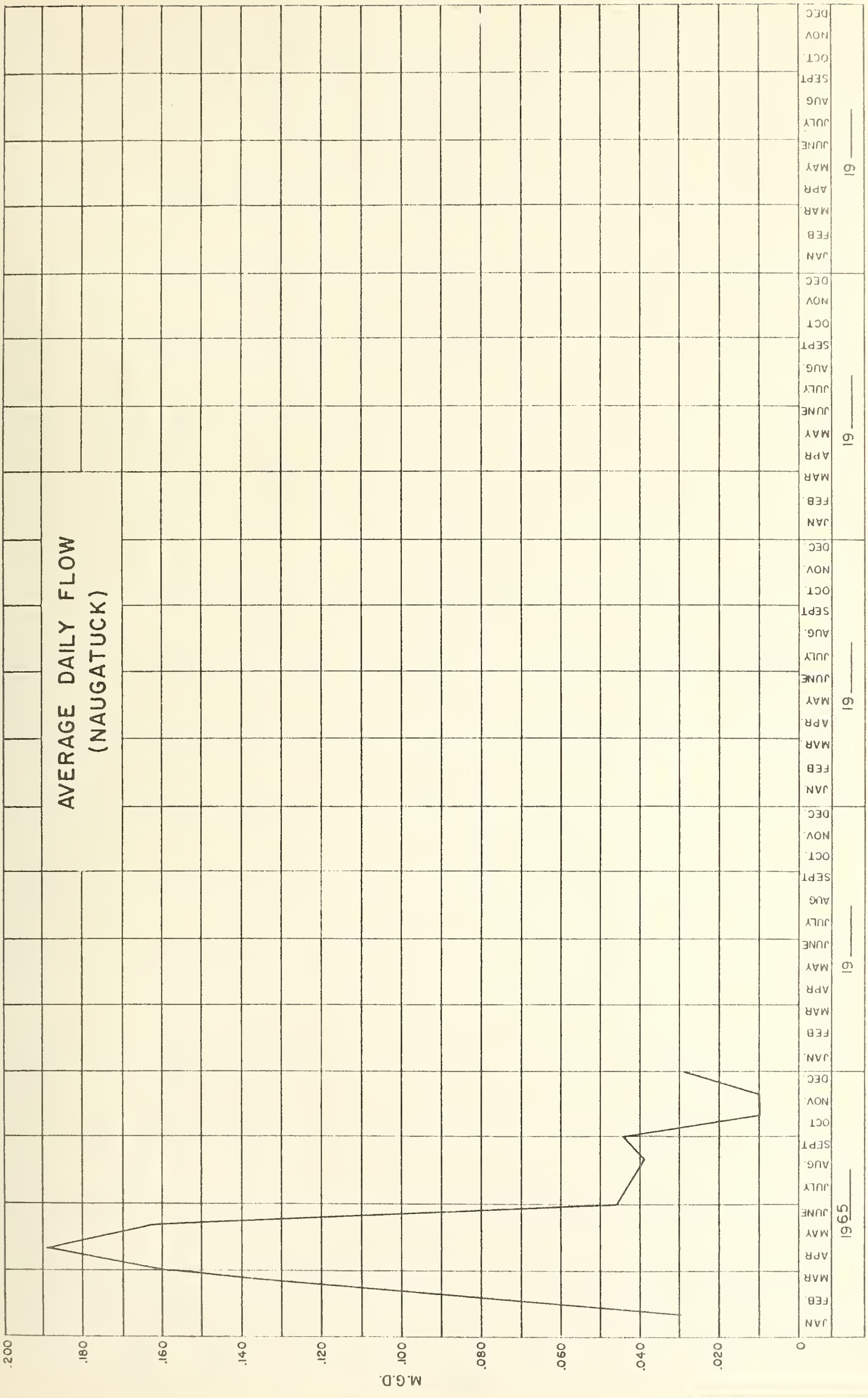
July	3	3.292	54	78	.234	380	70	3.526	108	131	43	65
	10	2.316						2.316				
	17	1.828						1.828				
	24	1.607	310	350				1.607	310	350	20	42
	31	.932	96	137				.932	96	137	17	43
Aug.	7	1.073						1.073				
	14	1.192	300	226				1.192	300	226	26	46
	21	1.214			(3) .027			1.241				
	28	.875	240	240	.240	300	90	1.115	240	258	47	52
Sept.	4	1.208	200	246	.368	1000	130	1.576	370	358	100	94
	11	3.291	108	100	.371	700	34	3.662	220	104	20	40
	18	1.723	88	116	.375	630	64	2.098	205	124	18	36
	25	1.906	110	190	.331	260	104	2.237	180	228	34	110
Oct.	2	2.368	240	204	.127	710	72	2.495	220	158	50	80
	9	2.387	220	132	.047	520	160	2.434	144	168	20	39
	16	3.354	64	99	.080	50	114	3.434	750	77	12	41
	23	3.129	47	130	.135	310	12	3.264	94	127	42	39
	30	5.088	9.6	45	.166	315	44	5.254	49	34	25	116
Nov.	6	3.359	68	91	.149	570	534	3.508	144	145	62	37
	13	3.275	74	63	(5) .065			3.340	57	65	30	78
	20	2.890			(1) .007			2.897				
	27	2.363	(4) 25	(4) 52	.080	(4) 230	(4) 66	2.443	(4) 33	(4) 56	(4) 14	(4) 46
Dec.	4	2.213	(3) 38	(3) 88	.196	(3) 570	(3) 224	2.409	(3) 100	(3) 103	(3) 40	(3) 96
	11	.824	87	86	.163			.987	164	110	25	54
	18	1.195	(2) 44	(2) 102				1.195	(2) 44	(2) 102	(2) 19	(2) 48
	25	1.095						1.095	(2) 71	(2) 118	(2) 12	(2) 40
	31	2.717						2.717	(2) 66	(2) 99	(2) 18	(2) 47
Avg.			105	127		550	132		188	129	79	63

Total Flows 1965	
Town	139.328 mg
Naugatuck	19.081
Total	158.409

Numbers in brackets indicate number of samples taken during week



AVERAGE DAILY FLOW
(TOWN)


AVERAGE DAILY FLOW
(NAUGATUCK)
M.G.D.
.200
.180
.160
.140
.120
.100
.080
.060
.040
.020
0
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1965
JAN. FEB. MAR. APR. MAY JUNE JULY AUG SEPT. OCT. NOV. DEC.
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JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
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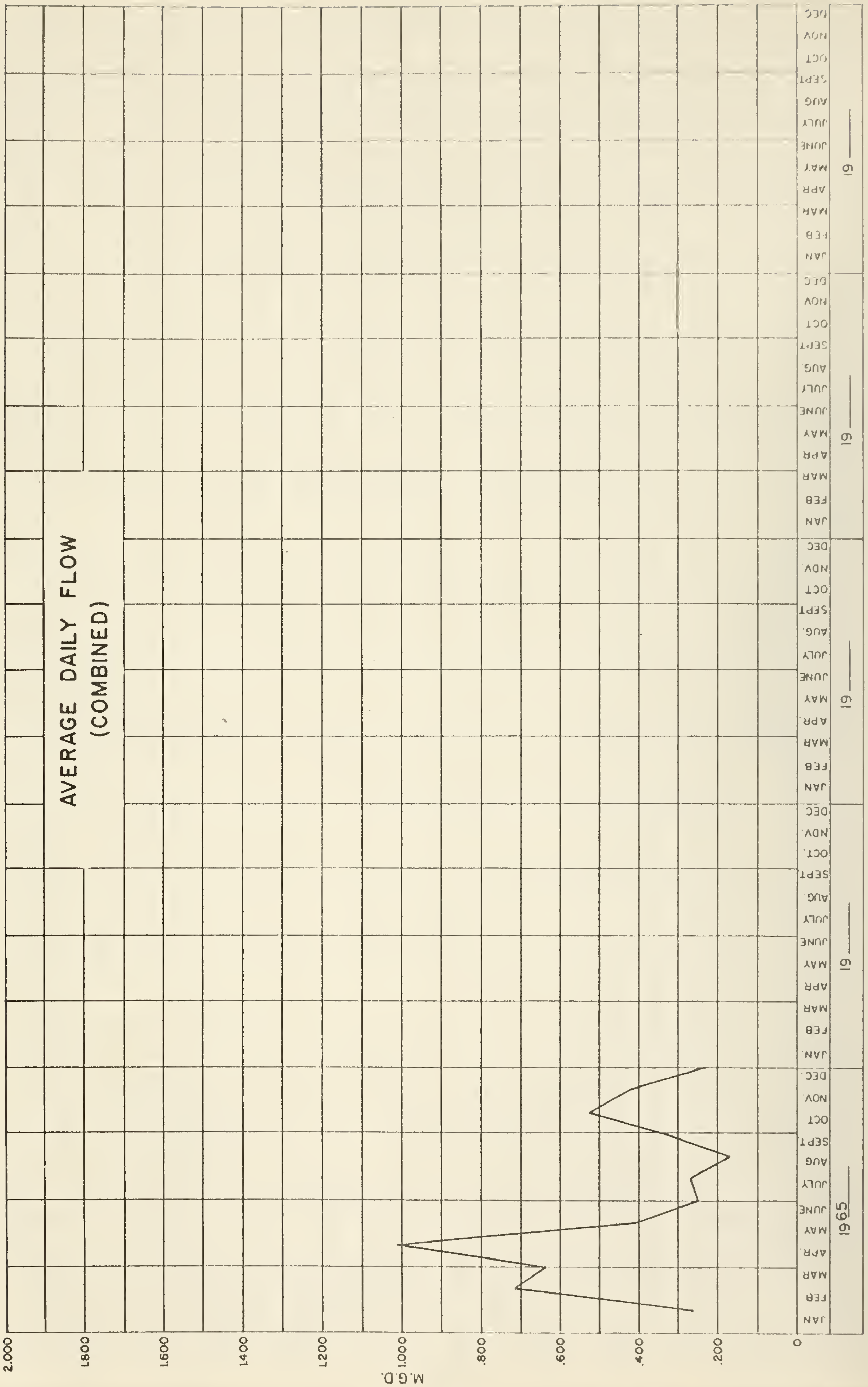
AVERAGE DAILY FLOW
(COMBINED)
M.G.D.
2.000
1.800
1.600
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1.000
.800
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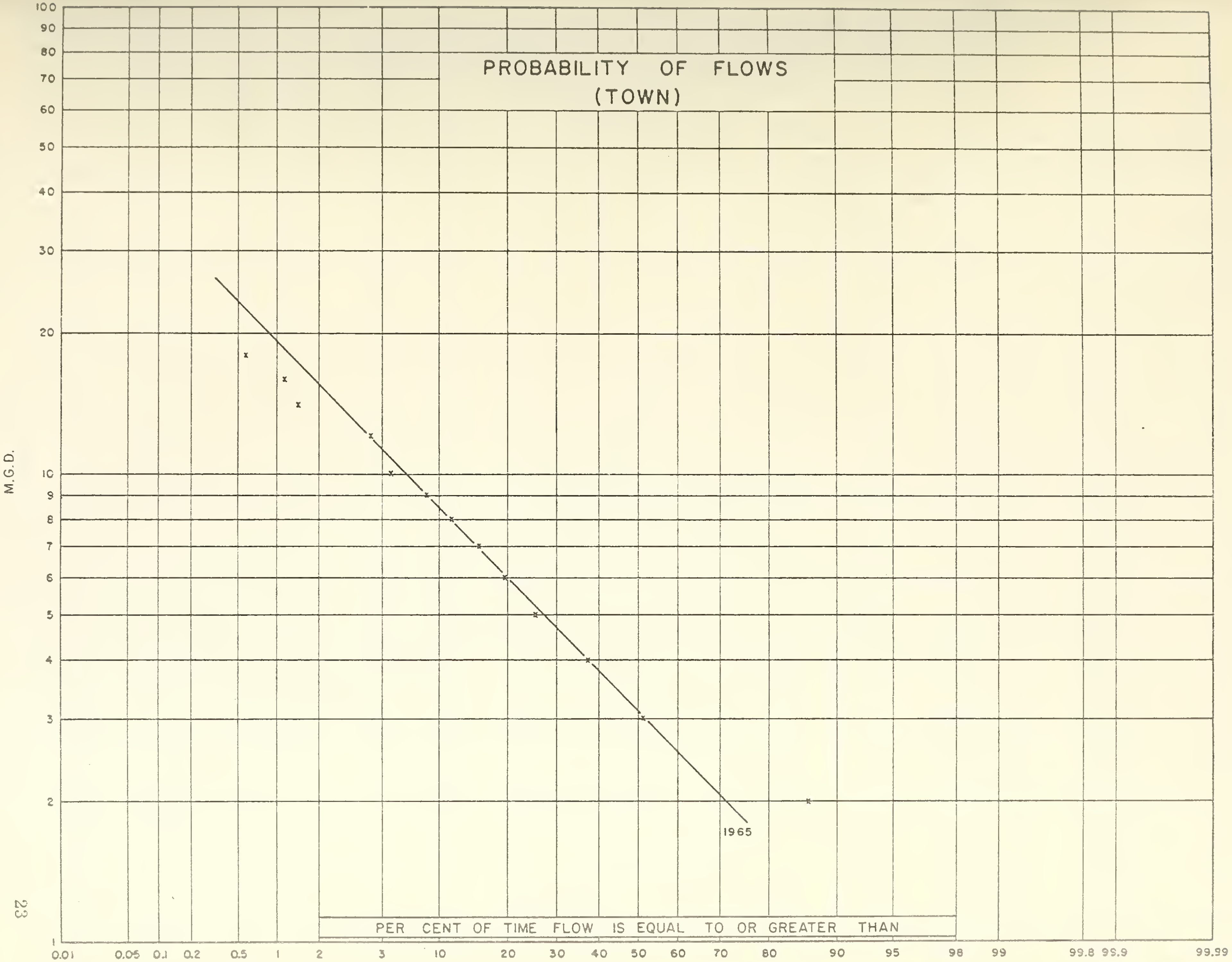
PROBABILITY OF FLOWS
(TOWN)
M.G.D.
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1965
PER CENT OF TIME FLOW IS EQUAL TO OR GREATER THAN
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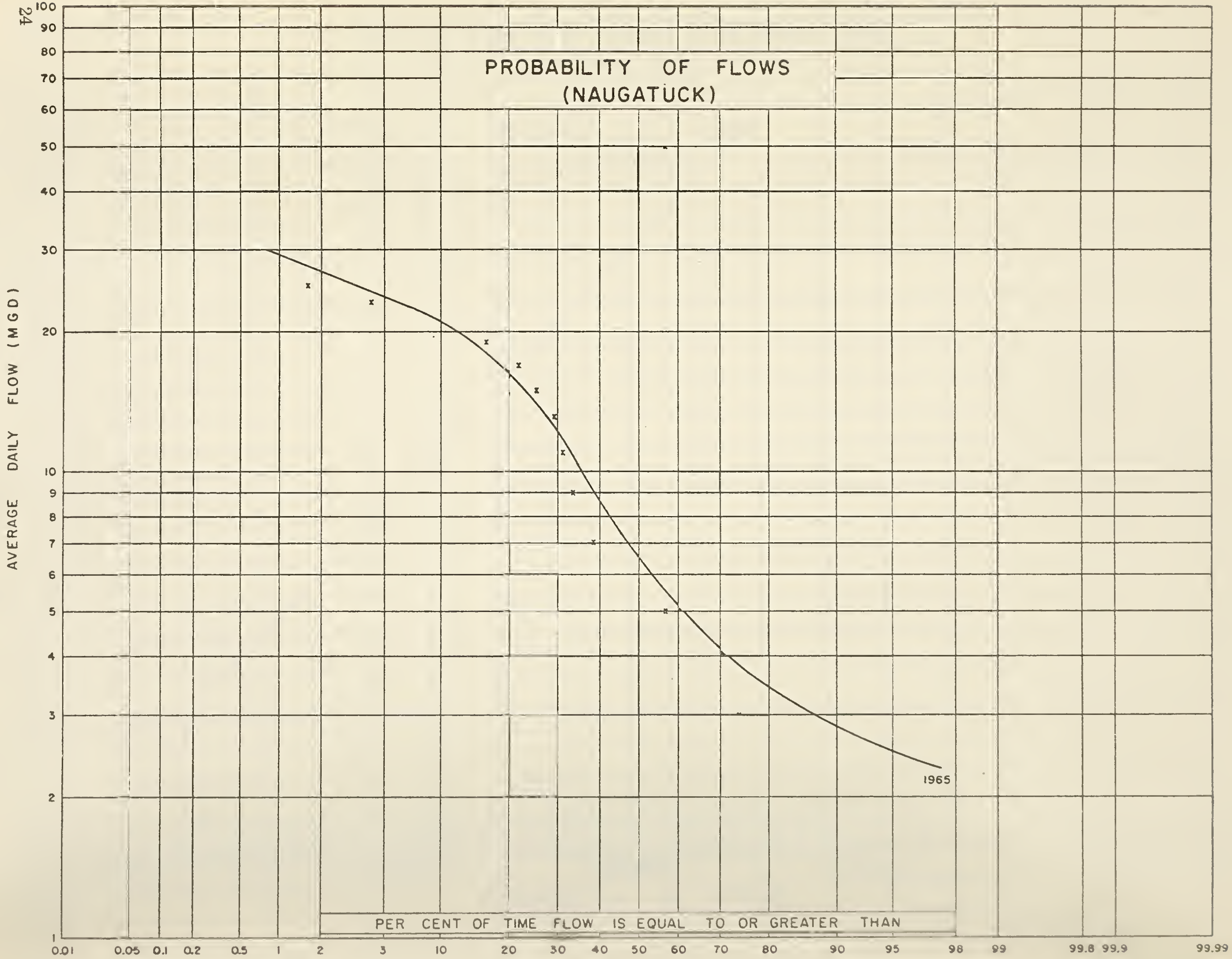
PROBABILITY OF FLOWS
(NAUGATUCK)
AVERAGE DAILY FLOW (MGD)
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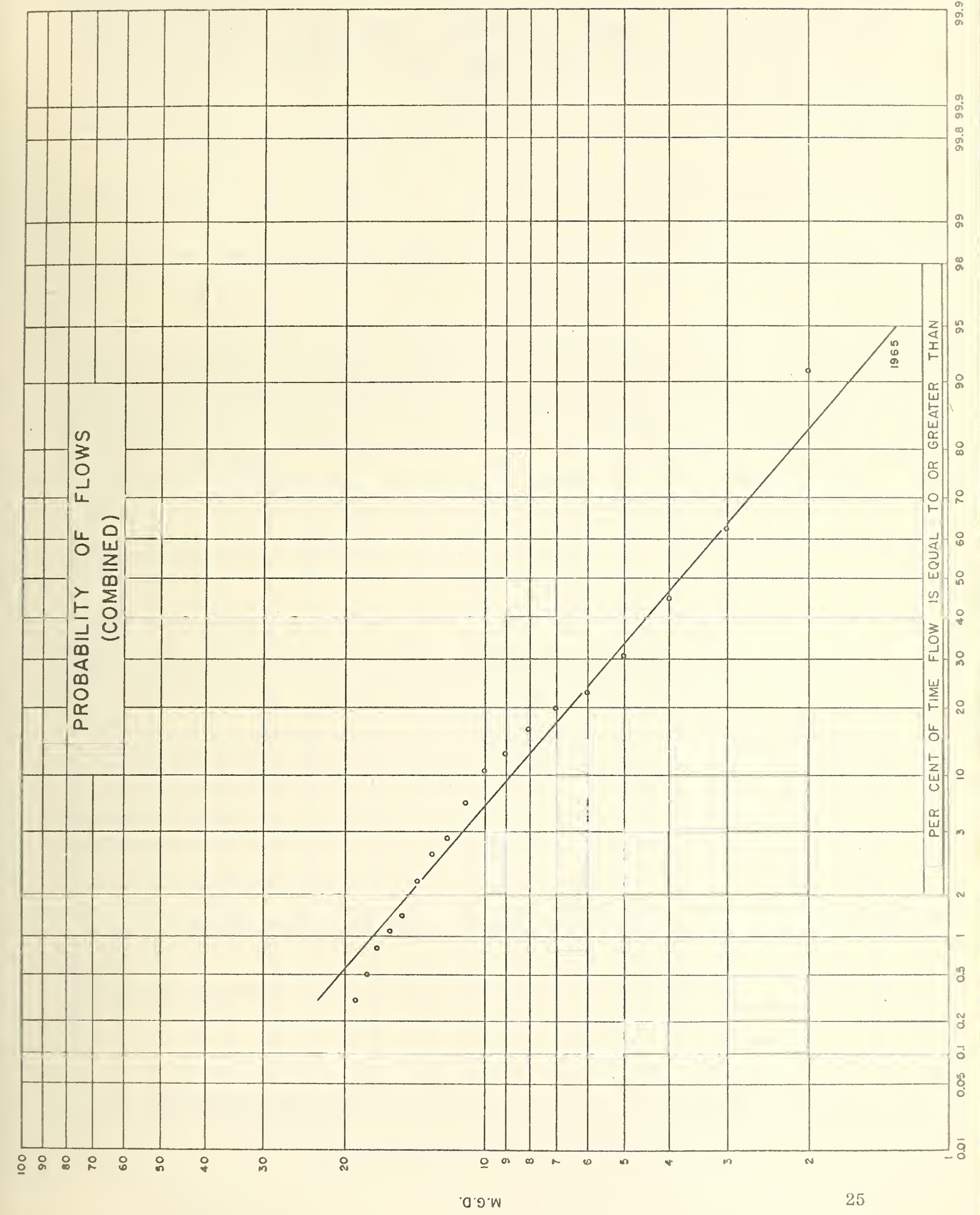
1965


PROBABILITY OF FLOWS
(COMBINED)
1965
PER CENT OF TIME FLOW IS EQUAL TO OR GREATER THAN
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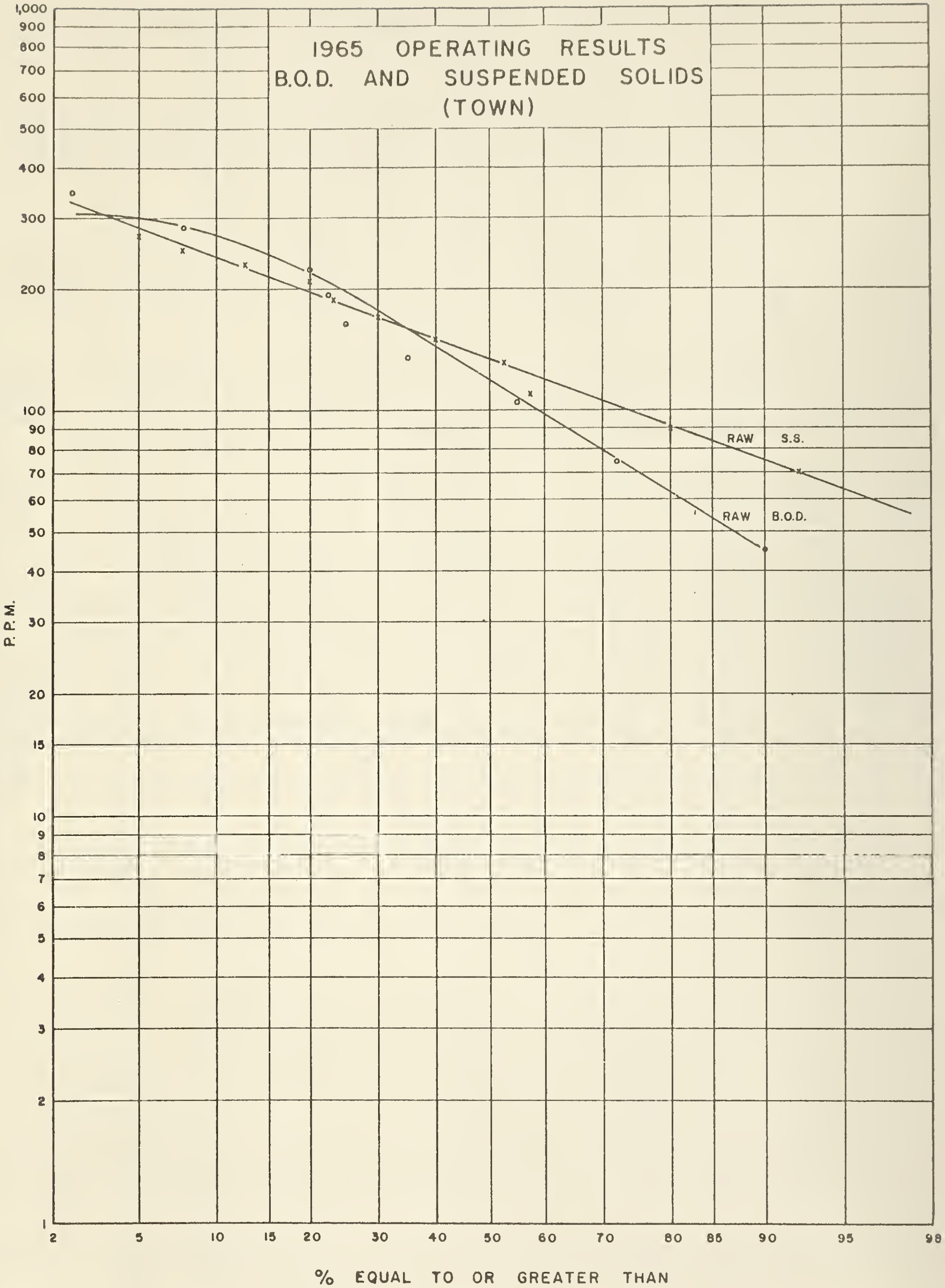
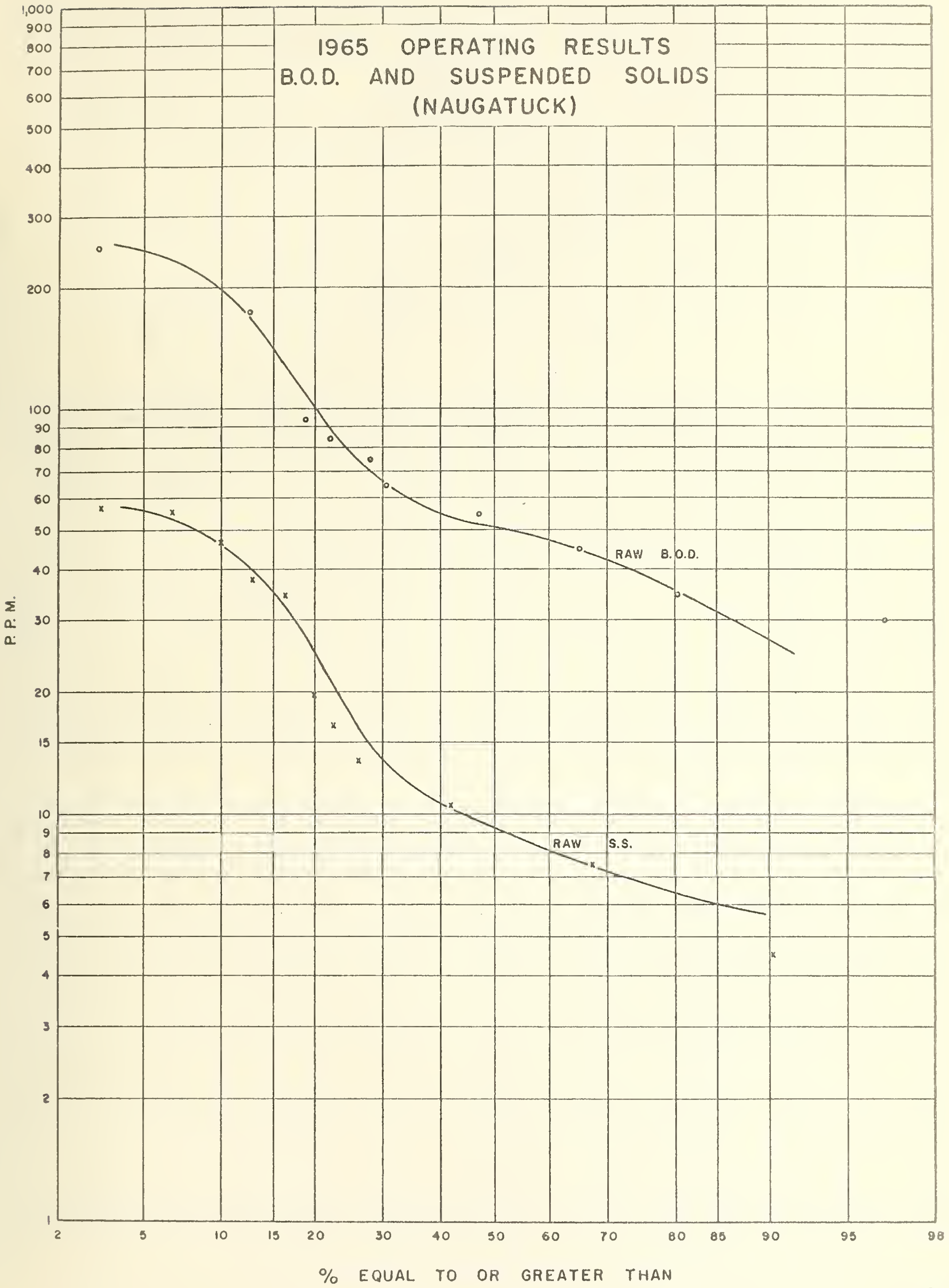
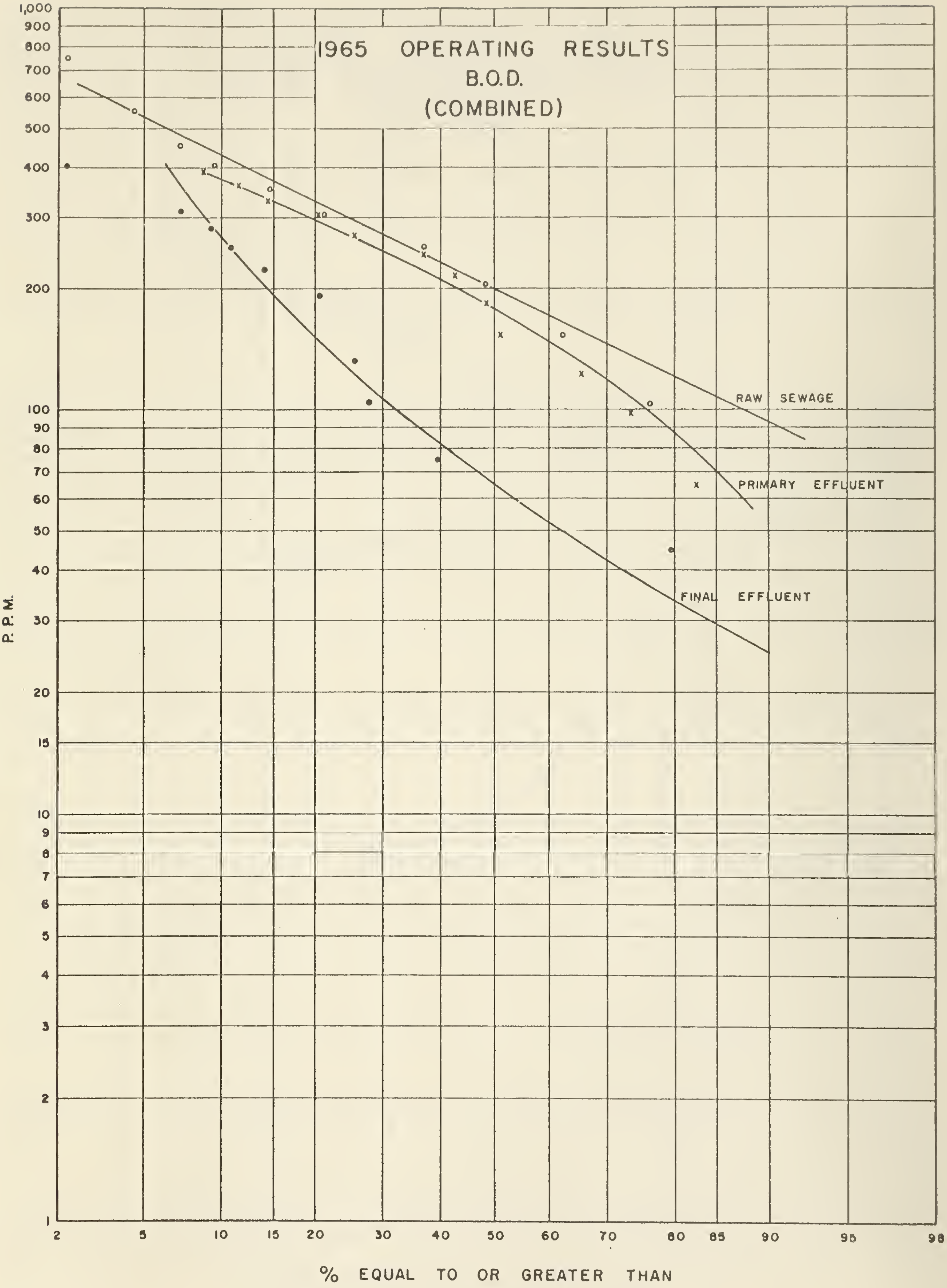
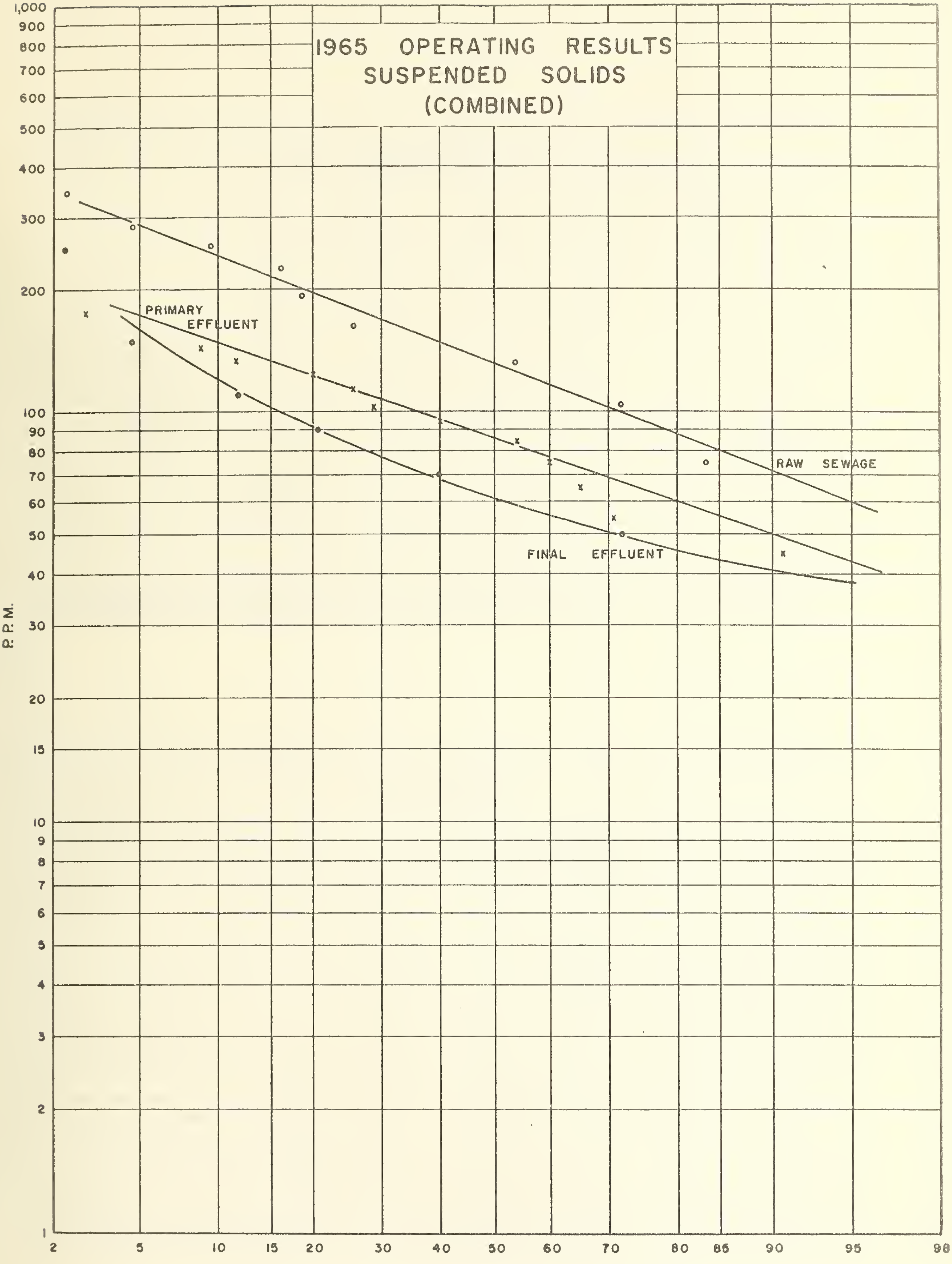
8
9
10
20
30
40
50
60
70
80
90
100



1965 OPERATING RESULTS
B.O.D. AND SUSPENDED SOLIDS
(TOWN)


1965 OPERATING RESULTS
B.O.D. AND SUSPENDED SOLIDS
(NAUGATUCK)
P.P.M.
1,000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
RAW B.O.D.
RAW S.S.
% EQUAL TO OR GREATER THAN


1965 OPERATING RESULTS
B.O.D.
(COMBINED)
P. P. M.
1,000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
% EQUAL TO OR GREATER THAN
RAW SEWAGE
PRIMARY EFFLUENT
FINAL EFFLUENT


1965 OPERATING RESULTS
SUSPENDED SOLIDS
(COMBINED)
PRIMARY EFFLUENT
RAW SEWAGE
FINAL EFFLUENT
P.P.M.
1,000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
2
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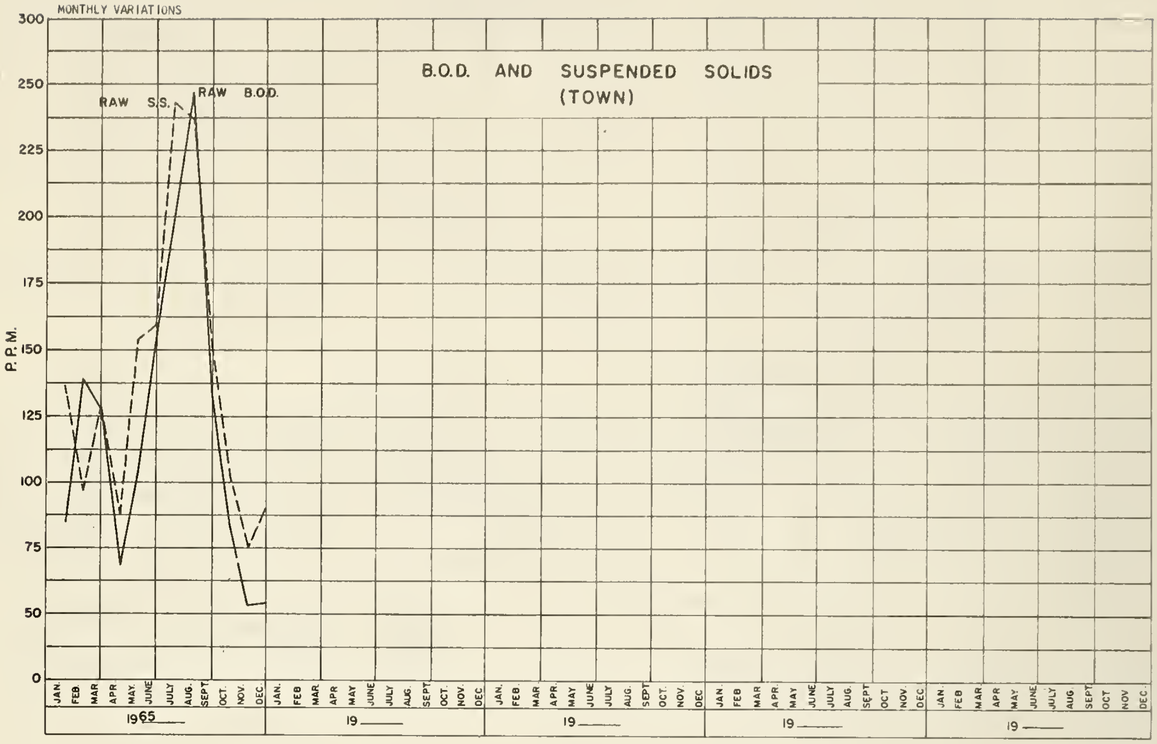
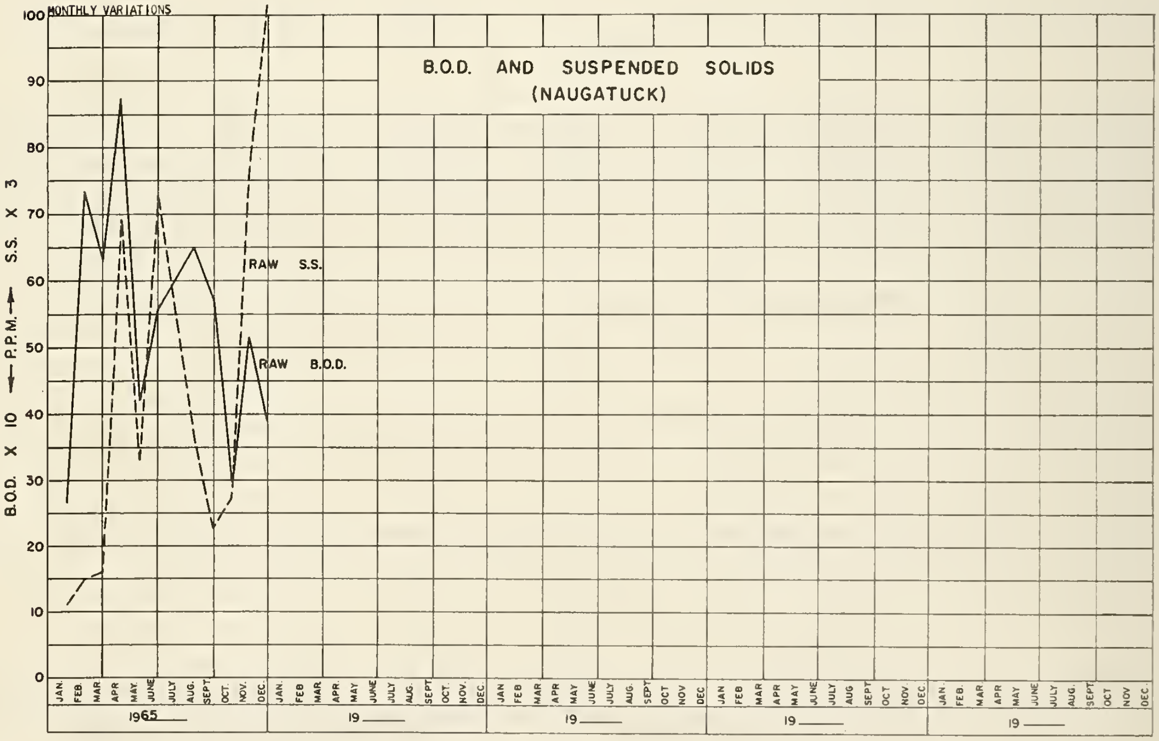
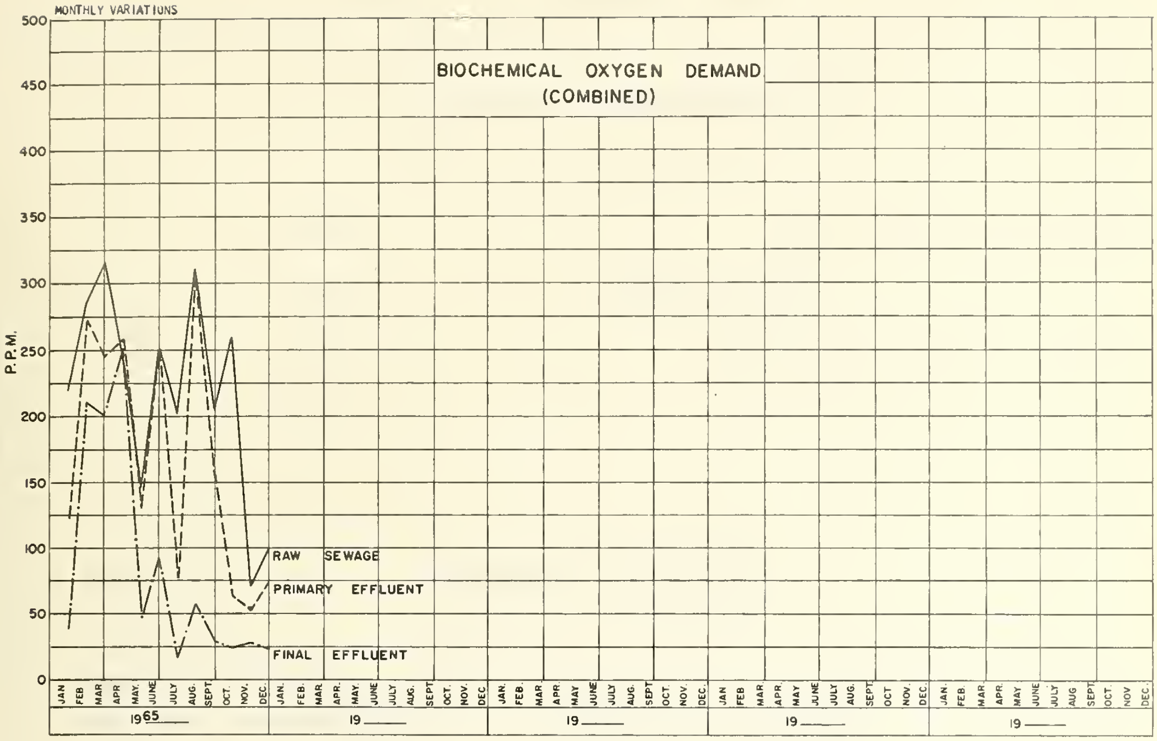
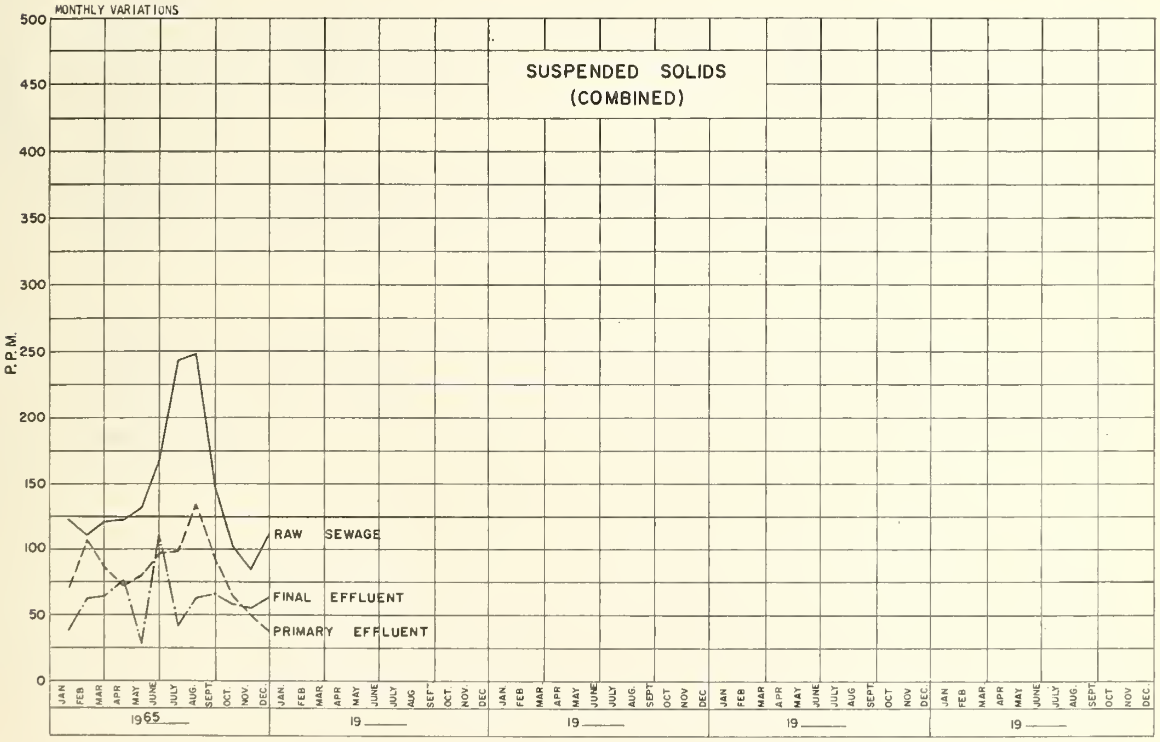
10
15
20
30
40
50
60
70
80
85
90
95
98
% EQUAL TO OR GREATER THAN


MONTHLY VARIATIONS
B.O.D. AND SUSPENDED SOLIDS
(TOWN)
RAW S.S.
RAW B.O.D.
P.P.M.
300
250
225
200
175
150
125
100
75
50
0
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1965
19
19
19
19


MONTHLY VARIATIONS
B.O.D. AND SUSPENDED SOLIDS
(NAUGATUCK)
RAW S.S.
RAW B.O.D.
B.O.D. X 10 ←— P.P.M. —→ S.S. X 3
100
90
80
70
60
50
40
30
20
10
0
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1965
19
19
19
19


MONTHLY VARIATIONS
BIOCHEMICAL OXYGEN DEMAND
(COMBINED)
P.P.M.
500
450
400
350
300
250
200
150
100
50
0
RAW SEWAGE
PRIMARY EFFLUENT
FINAL EFFLUENT
JAN FEB MAR APR MAY JUNE JULY AUG. SEPT OCT. NOV. DEC.
1965
19
19
19
19


MONTHLY VARIATIONS
SUSPENDED SOLIDS
(COMBINED)
P.P.M.
500
450
400
350
300
250
200
150
100
50
0
RAW SEWAGE
FINAL EFFLUENT
PRIMARY EFFLUENT
JAN FEB MAR APR MAY JUNE JULY AUG. SEPT OCT. NOV. DEC.
1965
19
19
19
19

GRIT, BOD AND SS REMOVAL

Total tons removed:	BOD	86.3
	Suspended Solids	52.3
Total grit removal (cubic feet)		325.9

AVERAGES PER MONTH

	Influent	Effluent	% Reduction	Tons Removed
BOD	188 ppm	79 ppm	58.0	7.2
Suspended Solids	129 ppm	63 ppm	51.2	4.3
Average grit removal (cubic feet)			27.2	

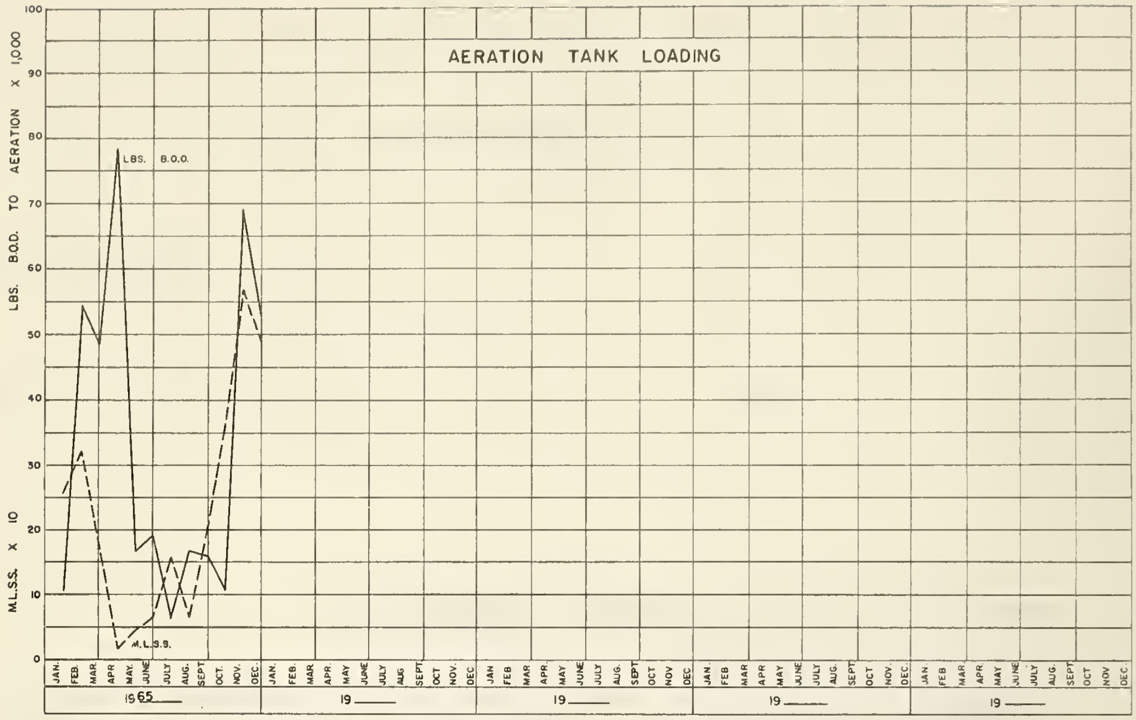
GRIT, B.O.D AND S.S. REMOVAL — COMMENTS

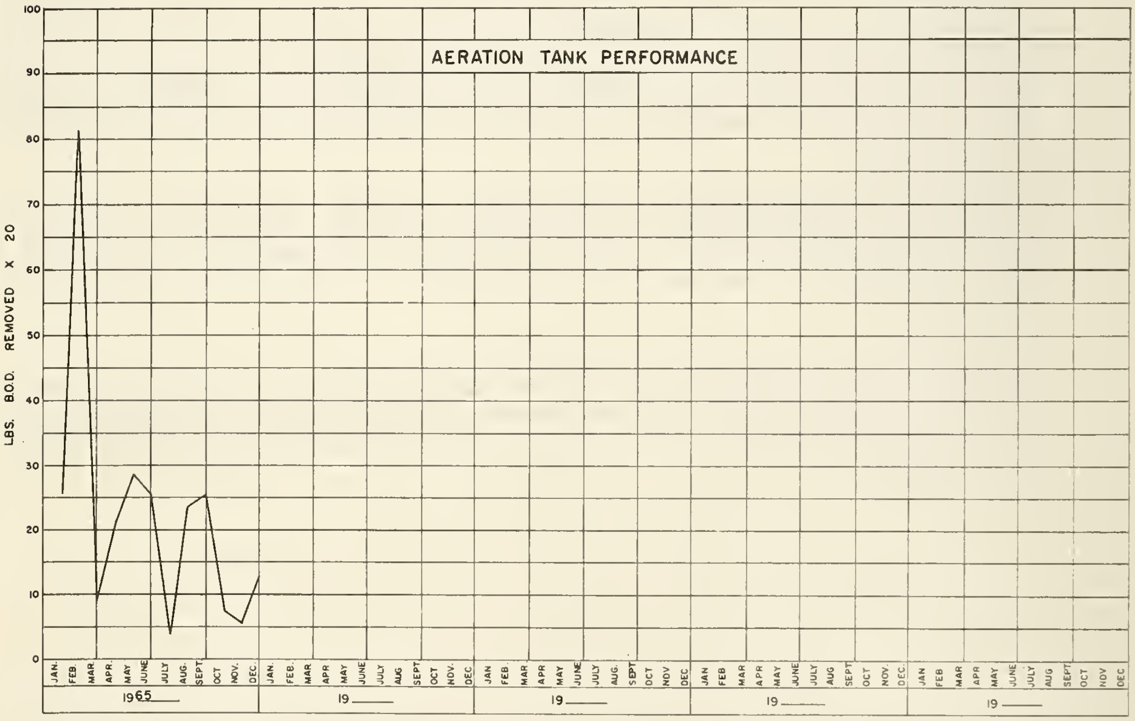
BOD and suspended solids data for Town sewage, Naugatuck Chemical's wastes and combined wastes are presented on a monthly average basis and on a probability basis on the accompanying graphs.

The average BOD of the Town sewage, Naugatuck Chemical's wastes and combined wastes for the year were 105 ppm, 550 ppm and 188 ppm respectively. The average suspended solids of the Town sewage, Naugatuck Chemical's wastes and combined wastes for the year were 127 ppm, 132 ppm and 129 ppm respectively. The average BOD and suspended solids in the effluent were 79 ppm and 63 ppm respectively. Average percent BOD and suspended solids removals were 58.0 percent and 51.2 percent respectively.

The design concentrations of BOD for Town sewage, Naugatuck Chemical's wastes and combined wastes were 170 ppm, 1000 ppm and 420 ppm and were exceeded 32 percent, 18 percent and 11 percent of the time respectively.

The design concentrations of suspended solids for Town sewage, Naugatuck Chemical's wastes and combined wastes were 300 ppm, 320 ppm and 306 ppm and were exceeded 4 percent, 16 percent and 4 percent of the time respectively.


AERATION TANK LOADING
LBS. B.O.D. TO AERATION X 1,000
M.L.S.S. X 10
100
90
80
70
60
50
40
30
20
10
0
LBS. B.O.D.
M.L.S.S.
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT OCT. NOV. DEC.
1965
19
19
19
19


AERATION TANK PERFORMANCE
LBS. B.O.D. REMOVED X 20
100
90
80
70
60
50
40
30
20
10
0
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT OCT NOV. DEC.
1965
19
19
19
19

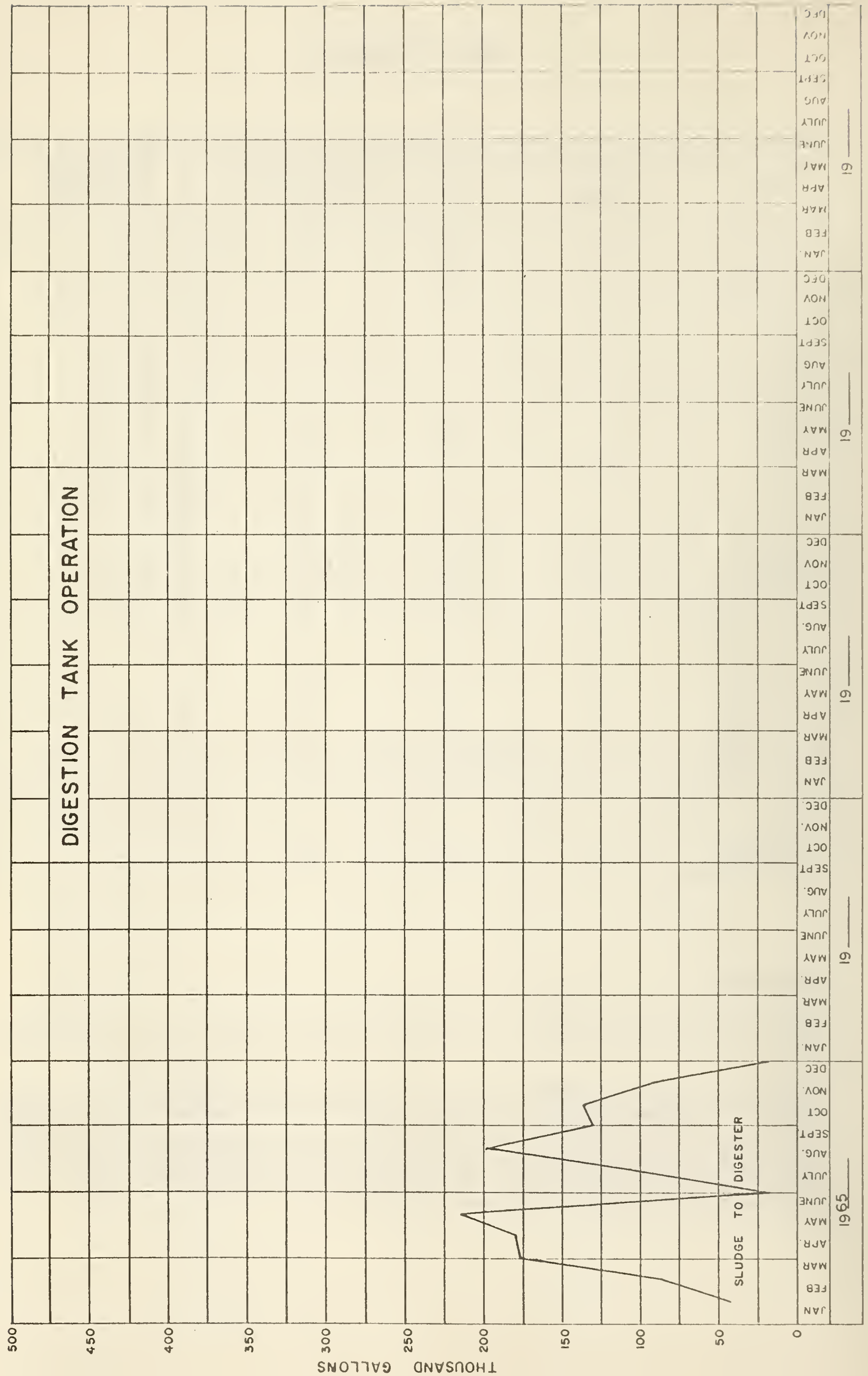
AERATION SECTION

MONTH	PRIM. EFFL B.O.D. P.P.M.	M.L.S.S. P.P.M.	LBS. B.O.D. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. B.O.D. REMOVED
JANUARY	122	1296	31	–
FEBRUARY	272	1600	70	–
MARCH	245	–	–	–
APRIL	258	82	2006	–
MAY	131	205	153	–
JUNE	252	324	164	–
JULY	78	795	13	–
AUGUST	310	324	107	–
SEPTEMBER	158	1029	35	–
OCTOBER	64	1779	10	–
NOVEMBER	54	2844	4	–
DECEMBER	74	2424	3	–
TOTAL	–	–	–	–
AVERAGE	168	1155	236	–

COMMENTS

Data pertaining to operation of the aeration section are included in the accompanying graphs.

Throughout the year the aeration section was not able to treat effectively wastes being received. In addition during the later part of the year the aeration section was unable to treat the entire volume of Naugatuck Chemical's waste produced. Various attempts were made to acclimatize the MLSS to the industrial waste with only limited success. The acclimatization procedure was also hampered by high flows from the Town caused by storm water infiltration in the sewer system.


DIGESTION TANK OPERATION
SLUDGE TO DIGESTER
THOUSAND GALLONS
500
450
400
350
300
250
200
150
100
50
0
JAN.
FEB
MAR
APR.
MAY
JUNE
JULY
AUG.
SEPT
OCT
NOV.
DEC
1965
19
19
19
19

DIGESTER OPERATION

SLUDGE TO DIGESTERS

	1000's cu. ft.		1000's cu. ft.
January	6.95	July	16.69
February	12.90	August	31.74
March	28.14	September	20.96
April	29.04	October	22.11
May	34.74	November	13.10
June	3.17	December	2.88
	Total	222.42	
	Average	18.54	

COMMENTS

A total of 222,420 cubic feet of sludge was pumped to the primary digester during 1965.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (P.P.M.)
JANUARY	8.270	* 252	4.10
FEBRUARY	20.066	439	2.19
MARCH	19.693	463	2.35
APRIL	30.329	491	1.62
MAY	12.590	624	4.96
JUNE	7.541	640	8.49
JULY	8.254	960	11.63
AUGUST	5.432	882	16.23
SEPTEMBER	9.988	849	8.50
OCTOBER	16.266	907	5.58
NOVEMBER	12.812	844	6.59
DECEMBER	7.168	895	12.49
TOTAL	158.409	8246	-
AVERAGE	13.196	687	5.28

* 23 days chlorination

COMMENTS

During the year, 8246 pounds of chlorine were used to chlorinate the final effluent. The objective was to maintain a chlorine residual of 0.5 ppm for a 15 minute period. Difficulty was experienced at times in determining the chlorine residual because chemicals in the effluent interfered with the chemicals used in the chlorine residual determinations.

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CONCLUSIONS

The plant provided substandard treatment throughout most of the year. High flows caused by storm water sewer infiltration, fibres and the nature of the industrial wastes were the major contributing factors in preventing the plant from efficiently treating the wastes received.

RECOMMENDATIONS

In order to improve the quality of the effluent and increase the efficiency of operation it is recommended:

1. That the Town take the necessary steps to solve the storm water sewer infiltration problem.

2. That the Town take the necessary steps to control the volume of fibres reaching the plant.

3. That Naugatuck Chemicals Ltd. construct stabilization ponds. These ponds should provide an industrial waste of a uniform quality, obviating shock loads.

TD
367
.A56
E455
1965
Elmira : water pollution control plant.
82202

TD/227/E55/W38/1965/MOE
Ontario Water Resources Co
Elmira water
pollution control plant: asvz
annual report c.1 a aa
1965

DATE DUE	BORROWER'S NAME

TD/227/E55/W38/1965/MOE
Ontario Water Resources Co
Elmira water
pollution control plant: asvz
annual report c.1 a aa
1965

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